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An outline or framework of the stages and steps to be employed in the process of planning a community college. State I is concerned with a survey and program summary for surveying educational needs and planning the education proposal and program. Stage 2 is concerned with the implications of stage I in terms of buildings, sites, and costs. All the major factors bearing on planning will have been analyzed and checked with educators for design of the master plan. Stage 3 produces a viable long-range development plan, together with a schedule of building operations and proportions of costs. A bibliography is included as well as diagrams and charts. (FPO)

Colleges of Applied Arts & Technology

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Survey and Analysis leading to the Master Planning of Colleges

Prepared by School Planning
and Building Research Section of
The School Business Administration
Branch: Ontario Department
of Education and
Leman-Sullivan, Architects and Planners

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"Upon assuming office a board of governors shall make a study of the post-secondary and adult-education needs of the area for which the college has been established and shall, as soon as possible after the first meeting of the board of governors, submit for approval to the Council of Regents a report containing specific recommendations concerning the proposed educational program." *(from regulations made under Department of Education Act: Section 4, Item 1.)*

A college of applied arts and technology is intended primarily to fulfil a post-secondary education role and to meet the unique economic, social, and cultural needs of the locality which it serves.

PREFACE

Any developing complex of buildings needs overall organization concepts for its orderly growth. Planners must also ensure that land, services, finances, and buildings are available when needed and that each new structure strengthens the total form. In times of rapidly changing ideas about education, and its role in our society, the plan should not be rigid since there can be no precise projection of long-range needs.

A framework is essential, however, to guide the physical growth and development of a college responding to new demands. This framework will represent a fusion of the viewpoints of many participants.

An emerging plan seldom proceeds in a logical sequence of problem-solving: each new participant will influence earlier concepts. However, an overall schedule of survey, program, analysis and design can be set up to develop a master plan.

This basic schedule of the planning process is explained in this study.

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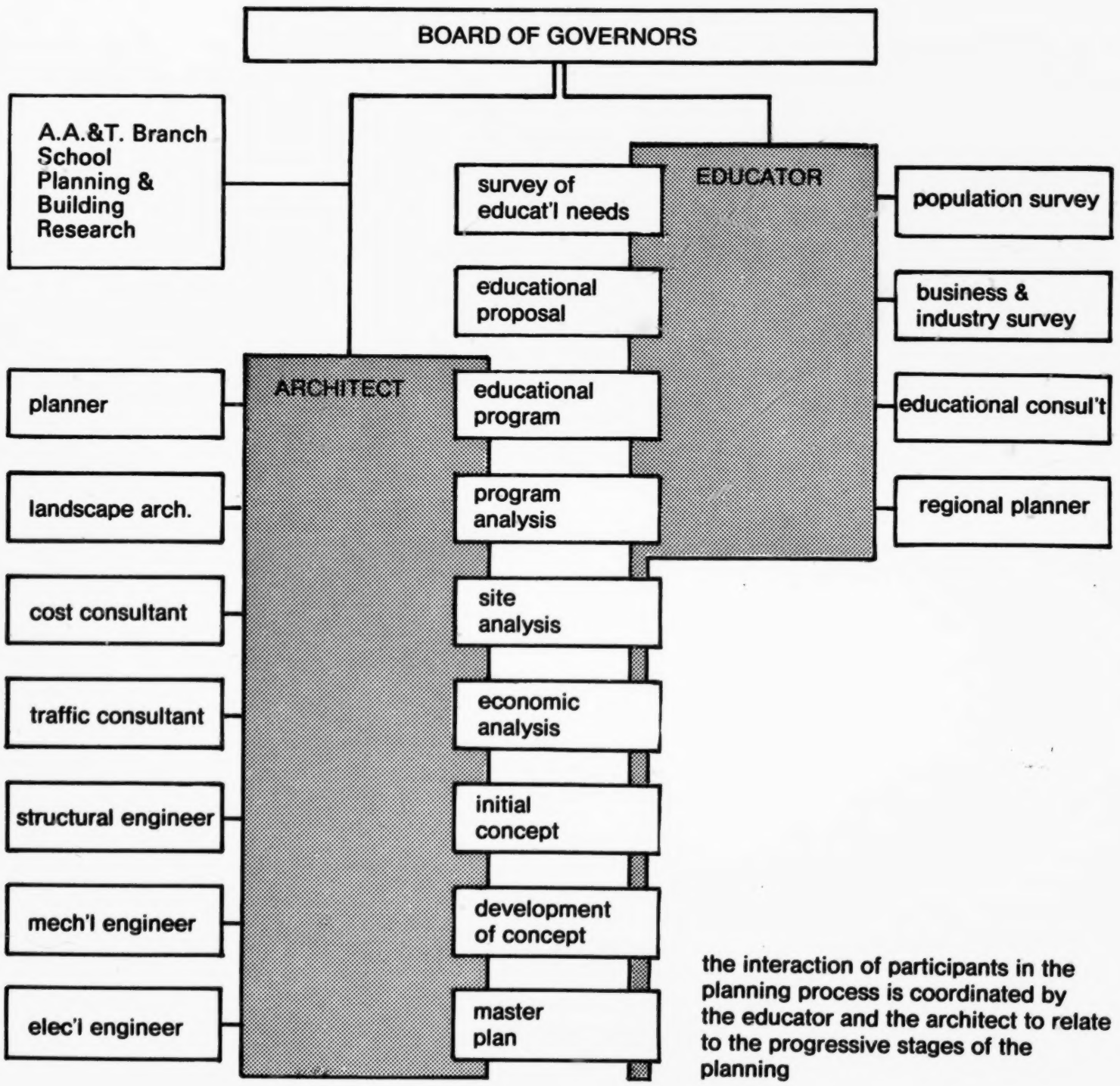
INTERACTION OF PARTICIPANTS



the interaction of participants in the planning process is coordinated by the educator and the architect to relate to the progressive stages of the planning

STAGE 1 - SURVEY AND PROGRAM

Survey of Educational Needs

Population
Economic Pattern
Educational Opportunities
Enrolment
Location and Transportation

Educational Proposal

Objectives
Location
Courses of Study
Enrolment
Facilities

Educational Program

Objectives
Courses of Study
Space Requirements
Space Relationships

TAGE 1 - SURVEY AND PROGRAM

is survey and program summary outlines the initial steps the planning process to meet these needs.
These first steps may be:
Evaluate current and future demand for post-secondary education in the region. Project the role of the college to meet this demand
Determine the intellectual, cultural and recreational goals of the community
Evaluate college-community integration possibilities
Ascertain the curriculum
Determine the location of the college
Calculate the projected enrolments
Estimate the space needed for the projected program.

Many sources can provide useful data:
School district enrolment projections based on anticipated growth of the community
Departments of education
Departments of economics and development
Departments of highways
Dominion Bureau of Statistics Census
Regional development conventions
Economic Council of Canada
Departments of industry, area development agencies
Studies by university departments
Joint planning boards
Manpower offices
Social planning council
Departments of municipal affairs

The survey and program stage requires examination of the equirements in more detail, under three sections, to establish guide to the type of data needed and the type of program formation to be evolved:
survey of education needs
education proposal
education program

Survey of Educational Needs

Population: Assuming that the college is primarily to serve the residents of the region, location is often determined on the basis of population distribution, patterns of growth and movement, and concentration of significant age groups.

A survey of population distribution should consider major concentrations of population in the area; population pyramid and age distribution; most easily accessible points from all parts of the region.

Growth pattern considerations include: areas where population growth is anticipated (based on existing patterns); areas of population loss; maximum growth area; population growth projections for significant areas; characteristics of mobile members of the population who are between nineteen and twenty-five years of age and their relation to the program.

Age group information should include: numbers and distribution of possible students; concentration of potential student population; relation of student population to general population distribution and growth patterns.

Economic pattern: College programs will correspond to the variety and distribution of employment opportunities in the region. Any survey must assess economic development and potential, and define the areas of present and future concentrations of industry and commerce.

Educational opportunities: The survey should list other post-secondary educational institutions in the region and determine their role, in relation to the proposed college, and to the educational needs of the community.

The location of other institutions, their present source of students, and their projected courses of study will also be important.

Enrolment: Probable enrolment figures can be assessed by a survey of potential students, especially those presently in secondary school. This survey could also include information about adult education and community interest in special courses. Any study will, of course, be concerned with both immediate and long-range programs, and take account of changing educational and industrial patterns in the region.

Location and transportation: Ideally the college should be located close to the centre of the population it serves, but it will still rely largely upon automotive transport for students and staff. Therefore, in addition to the availability of public transportation, existing and proposed highway patterns must be important factors in choosing a site.

There is no provision for on-campus housing in the present program since the enrolment will come predominantly from areas within commuting distance and be supplemented by students boarding out.

Educational Proposal

Assessment of the *Survey of Needs* will lead to a proposal of educational courses most likely to meet these needs.

The type of courses chosen will depend on the requirements of both the people, and the economy of the area to be served. Students may possibly need training which will equip them for opportunities beyond the influence of local industry. All of these requirements should be outlined in the proposal, together with a preliminary assessment of the facilities needed to accommodate the necessary courses.

The original proposal must meet not only immediate needs, but should attempt a projection of future courses and facilities.

The proposal could contain:

Objectives: the role of the college in the region and in the community; the relation to other educational institutions in the area, and to local and regional industry and commerce; a general description of educational objectives.

This section should deal with the concept of the college in relation to the specific population it will serve; to the direction in which it could develop; and to projections on optimum and ultimate size.

Location: Describe all aspects bearing upon the proposed location, including: relation to present population and growth and to potential student population; the relation to employment opportunities; relation to transportation, travelling distances and accommodation for potential students; and convenience for community use.

Courses of Study: Describe type, length, and content of existing and projected courses, including advanced, night, extension, adult education and retraining courses.

Describe the potential student body in terms of distribution, age group, educational and social background.

Enrolment: Project the proposed growth patterns, in relation to the needs of the area, over fifteen years, in terms of students per course and per year. These academically desirable patterns will form the basis of policy decisions, although they may be modified by practical considerations in the program and analysis stages.

Some policy influences might be:

—desire for fast initial growth to meet student demand for certain courses
—need to maintain staff quality during period of growth
—need to test new teaching practices before their full implementation
—desire to specialize, thus encouraging a more rapid expansion in one group of subjects than in another
—desire for slow initial growth owing to difficulties in existing accommodation.

Facilities: General concepts will include:

Academic:
Size of groups ☐ types of teaching space ☐ teaching methods, group, individual study, lecture, seminar, television ☐ study areas

Resources centre:
Role in college ☐ community use ☐ use as study centre

Physical education:
Program requirements ☐ community use ☐ outdoor and indoor ☐ special training programs

Communal:
Common rooms ☐ special activity areas ☐ areas for community use ☐ provision for food services

tdoor facilities:
Agricultural, nature, conservation programs ☐ passive areas
☐ outdoor teaching spaces

culty:
Common rooms ☐ study areas ☐ offices

lucational Program

hen the educational proposal has been approved, the pro-
ted courses of instruction and probable enrolment figures
st then be expressed in terms of physical space and environ-
nt. Then, in the following stages, they may be analysed for
orporation into the master plan.

jectives: Describe, in general terms, the educational pro-
m, philosophy, and facilities including: educational goals;
jections of future directions; relation to community; general
ucational methods; student-teacher relations; operation of
llege.

urses of study and enrolment: Describe all immediate and
jected courses; show enrolment figures, projected annually
first five years, and for 10 and 15 years on a long-range
sis; and the faculty-student ratios.

ace requirements: Describe the area for each department
d activity in terms of: function and activities; teaching
thods; sizes and kinds of groups; storage and preparation
oms; and special environmental needs.
Tabulate against each department and activity (stating
owances of teaching spaces by square foot): the number of
aching spaces; type of activity area; scheduled hours; student
tions; and approximate room sizes.

Space Relationship: Describe the desired relation of spaces within the building, and between indoor and outdoor uses. Such description will form the basis of circulation patterns; separation of noisy areas; centralization of important functions; interaction between students; and ease of community use.

Some of the major elements to be related are:
Library ☐ student centre ☐ administration ☐ faculty ☐ technology departments ☐ arts department ☐ other departments ☐ physical education ☐ study areas ☐ audio-visual production area

STAGE 2 - ANALYSIS

Program Analysis

Objectives
Courses of Study
Space Requirements
Space Relationships

Site Analysis

The Region
The Community
Site and Environs
Soil Investigation

Economic Analysis

STAGE 2 - ANALYSIS

Stage 1 dealt with the educational needs of the community and the formation of a program of educational objectives and facilities designed to satisfy those needs.

Stage 2 is concerned with the implications of Stage 1 in terms of building, site, and cost. The analysis of these different aspects will proceed simultaneously since they all affect one another, and this may well reveal a need to modify the educational program on which they are based. At the conclusion of Stage 2, all the major factors bearing upon planning will have been assessed and cross-checked with the educators in preparation for design of the master plan.

Program Analysis

Objectives: Review the objectives set out in the *Educational Program*. Examine the demands made on the plan by the stated objectives. Review educational objectives to reinforce or redefine them following this examination.

Courses of study and enrolment: Consider program requirements for enrolment and evaluate them against other factors being analysed, such as rates of completion of buildings, sequence of evacuation of existing buildings, availability of capital, and capacity of site.

Space requirements: Analyse the description and tabulation of use-areas provided in the program. Estimate area requirements not specifiically covered by departments or activities. Establish the space requirements of various programs planned for the college. Tabulate total estimated net space needs over projected period.

Evaluate existing facilities, discuss findings, and make necessary adjustments.

Space relationships: Prepare diagrams of flow and circulation to explore the suggested relationships in the *Education Program*. Determine need for further information about relation of one area to another.

Review findings and make necessary adjustments.

Site Analysis

Site analysis is necessary to determine the influence of the region, the community, and the site upon development of the college, its potential, and its cost. The college, in turn, will have a considerable effect upon the community's commerce, industry, culture, and land values. These complementary influences must be assessed.

The form of the site analysis must be tailored to the characteristics of the particular site and surroundings, but this section will indicate the general scope of information to be obtained and analysed.

The Region: In determining the influence of the region upon the college, the following factors should be explored:

Transportation:

Major arteries ☐ nodal points ☐ traffic volume ☐ bus, commuter train routes, air, rail, ferry terminals

Schools:

Location of other post-secondary institutions, public and private

Development program:

By conservation authority ☐ flood control schemes ☐ highway ☐ railroad ☐ other

Culture and recreation:

Location of cultural facilities, museums, galleries, theatres ☐ location of provincial parks, conservation centres, winter and summer recreation areas

A graphic summary of this information would be useful to later planning studies.

The Community: Its facilities, future plans, and expected growth must be analysed in order to determine their effect on the college. Study population forecasts, community utilities, local zoning by-laws, and the ability of the community to provide social and service amenities.

Analysis should include:

Urban circulation:

Major arteries ☐ major intersections near site ☐ major approaches to community and site ☐ accessibility of site

Transportation:
Pattern of bus routes ☐ stop locations ☐ capacity of system ☐ accessibility

Commercial facilities:
Location of stores, shops, restaurants, etc.

Utilities:
Locations of water, sewer, hydro, telephone, gas services ☐ capacity ☐ location of trunk lines ☐ source of water ☐ cost premium considerations ☐ planned improvements in services that would affect availability or capacity

Cultural and recreational facilities:
Locations and types

Zoning:
Determine how present and future land zoning regulations might affect physical development of the campus and its environs.

The zoning information could be summarized on a base map with an analysis of the implications of the zoning factors and a list of conclusions.

Site and Environs: An analysis of the campus site and its natural and man-made features is necessary to determine its effect upon campus development.

The investigation and analysis should not stop at the site boundaries but should include "total site", the environs to visual limits. All things seen, heard, felt, and smelled are part of the site and should be considered. Any natural or man-made feature that affects the site is a planning factor.

Topographic Survey:
A site survey should be obtained and it is recommended that a topographic survey specification be prepared for each site.

A check list of items might include:
—survey title, location, scale, north-point, certification and date
—property line, dimensions and bearings
—building lines, overhead and underground easements for gas, hydro, and water
—ownership of adjacent property
—names and locations of existing roads abutting on property
—locations of buildings and structures such as foundations, piers, bridges, culverts, wells, and cisterns
—location of walls, fences, curbs, roads, drives, gutters, steps, walks, and paving: (indicate both materials and surfacing)
—location, type, size, and flow of storm and sanitary sewers, on or near property: (record elevation of top of invert, location of manhole and catch basins)
—location, type, and size of water and gas mains, manholes, valves, and hydrants
—location of utility poles, and telephone lines
—location of nearest utilities if not on site. (Show on the key plan and give all essential information)
—location of swamps, boggy areas, springs, streams, bodies of water, and drainage ditches
—location of wooded areas (indicate size and type of trees)
—elevations at useful intervals along centre line of road and flanking gutter
—elevations at tops and bottoms of breaks in grade, contour lines at two-foot intervals
—spot elevations accurate to one-tenth foot, contours accurate to one-half contour interval

Soil Investigation:
Exploration tests will provide basic information for:
—designing foundation type and depth
—bearing capacity of foundations and soil
—determining foundation and building settlement
—establishing ground water level
—providing against construction difficulties
—locating the depth and nature of fill, if any
—establishing thickness of topsoil
—determining the suitability of soil for backfill

Site reconnaisance and initial random borings will disclose the characteristics of the soil. Successive borings should follow patterns suggested by the initial information, to give a clear indication of the arrangement of soil strata.

Site Observations:
Much valuable site information can be gathered through the survey and exploration methods and laboratory tests, however, there is a great deal of information about the character of a site that can only be observed in the field.

The following research and site observations, plotted on a topographic survey map, should supplement site survey and exploration information:
—walking distances from site centre
—quality of views
—list of trees to be preserved or removed
—type of land drainage
—location and bearing of off-site nuisances
—macro and micro-climate conditions
—location of elements offering protection from sun, wind
—direction and force of prevailing wind
—temperature range
—erosion
—possible frost pockets
—topsoil condition
—location of ground cover, shrubs

Research will provide rainfall figures, sun diagrams, and temperature ranges.

As a preliminary to planning, significant site factors can be illustrated by a site analysis diagram.

The (site) analysis should summarize all the conclusions — regional, community, and site — judged to have a major effect on the planning of the college. Such conclusions could be presented on a topographic map of the site and its environs.

Economic Analysis

The general scope of this analysis is to study the costs of construction labour, materials, and building techniques in the locality and to compare them with resources available outside the area. Also, what is the ability of local industry to undertake a developing campus construction program with its need for economy in both cost and time?

The analysis of cost factors which will affect the ultimate might include:
—alternative systems of construction, in order of increasing costs
—operational costs of colleges under alternative systems of construction
—effects of construction-phasing on the economics of the various construction systems
—effect of bid-timing on cost
—establishing parameters of local building economy, through an analysis of the local labour market, available materials, and building competition
—analysis of available fuels and their rates

STAGE 3 - THE CAMPUS PLAN

Initial Concept

Design
Cost Studies
Implementation

Development of Concept

Design
Cost Studies
Implementation

The Master Plan

The Physical Plan

Objectives
Site: Regional and Local
Plan Concept
Circulation
Utilities
Growth
Academic Areas
Communal Facilities
Athletics
Architectural Form
Spaces
Environs
Landscape

Cost Studies

Operational Program

STAGE 3 - THE CAMPUS PLAN

This final stage in the planning process will produce a viable long-range development plan, together with a schedule of building operations and projection of costs.

It is recommended that this stage be divided into three phases, so that an evaluation can be made at the end of each phase, and the conclusions consolidated, before moving to the next.

First would come the *Initial Concept*, proposing the basic environment; then the *Development of Concept*, to expand and test the basic objectives; and finally, the *Master Plan* to detail and document the study.

Initial Concept

This stage includes development of the broad planning aspects of design, site use, circulation, parking, building density, expansion, and flexibility. It should also include exploration of alternative concepts, with comparative analysis of design, cost and scheduling advantages.

Design: Using conclusions derived from the program and analysis stages, propose the concept for total environment in terms of its educational, social, recreational, cultural, and visual aspects.

Consider how building form is influenced by climate, land configuration, movement systems — both pedestrian and vehicular, available utilities, and community relations. Study the relation between the site and the surrounding neighbourhood.

Establish the relation between major plan elements such as administration, technology group, applied arts group, parking, outdoor activities.

Examine methods of change and growth used to accommodate projected enrolments, to promote orderly expansion, so that minimum disturbance will be caused by future building operations. Examine the maximum growth potential with available alternatives if growth varies from projection.
Graphic proposals at this stage could illustrate:

Structures:
Show general disposition of land use, indicating gross building areas where applicable.

Outdoor areas:
Locate general areas of athletic facilities, recreational use, parking.

Circulation:
Illustrate major movement patterns of pedestrians and vehicles.

Utilities:
Locate major utility lines.

Expansion:
Show general system of expansion of major elements.

A written description could be used to amplify the proposed environment which will meet the philosophical, academic and community objectives set by the program.

Cost Studies: Such studies at this stage would be comparative, introducing the cost factor into different planning concepts.
Comparison between concepts may include:
—extent of initial and future site developments
—type and extent of utility services
—parking arrangements
—response to unusual soil conditions
—density and height of buildings

Implementation: Show how the building program can be phased in relation to the availability of capital funds, and occupation dates projected in the education program. Indicate how the facilities will be grouped to satisfy the objectives.

Relate existing, temporary, and new buildings in the projected schedule. Major projects, such as land acquisition, site development, new utility lines and major transportation routes which influence projected completion dates, should also be scheduled.

When the *Initial Concept* phase is completed, the major lines of the scheme will have been established and should be approved. Aspects needing further investigation and study should be identified.

Development of Concept

The purpose of this phase is to develop the concept to a level of detail where its feasibility can be judged, and the scheme assessed against the original planning objectives.

Design: Expand the following aspects of the concept:
—scale of elements and spaces of the campus
—expansion plans, interference with campus activities by building operations and the character formed at each phase
—relation of all facilities and activities of the campus
—movement systems for pedestrians, vehicles, and utilities network
—interpretation of education and social philosophies in terms of physical environment
—relation of structures and activities to topography
—proximity effects of different departments, noise, interaction students and heavy servicing features.

Graphic proposals could illustrate as follows:

Structures:
Show general form of building within designated land-use areas.
Relate building groups to one another and to site elements such as major contour changes and planting.

Athletic areas:
Locate program and activities

Parking areas:
Allocate specific areas and indicate capacity.

Circulation:
Locate roads, paths, and general pedestrian areas.

Utilities:
Show location, size and direction of flow for major utility elements such as sub-stations, water treatment plants, and sewage disposal.

Expansion:
Indicate the direction and extent of growth and additional building footage, together with the acreage of athletic and parking facilities that can be accommodated at maximum growth.

Cost Studies: Undertake studies to evaluate the feasibility of the approved concept. Having developed the concept to a more advanced stage, it is now possible to perform qualitative and quantitative studies on:
—mechanical, electrical and drainage services
—special foundations
—circulation systems
—special site work
—fuel studies
—any other significant items that would need economic justification.

Identify any cost escalation factors indicated by studies of building industry trends.

Implementation: Outline the preliminary steps required to implement the plan. Consider:
—land acquisition
—authority approvals
—construction schedules and phasing
—base budget estimates for each phase (buildings, site work, services)
—identification of actions required by other agencies (e.g. Department of Highways, municipal authorities)
—other special studies required

Modify base budgets as necessary to reflect special conditions. With buildings, they may be increased because of abnormal site conditions or by escalation because of timing. Phase budgets should also respond to time factors.

The conclusions reached at the end of this *Development of Concept* phase will form the basis for final development of the *Master Plan*. Should the scheme prove to be prohibitive in cost, or inadequate to accommodate the education program, it may be necessary to revert to alternative concepts and check their feasibility.

The Master Plan

This final development stage will take the approved concept outline and document it to become the basis for the logical, orderly growth of the college. Design and development drawings, economic studies and operation schedules will be combined with a written description of program, principles, and

objectives to guide the development of the campus. The resulting plan should not be rigid. It should be considered a framework, within which there is freedom to meet the needs of a changing educational program.

The Physical Plan

All elements of the campus environment should be considered. It may be necessary to study in some detail the size, form, scale and probable sequence of buildings in order to determine the workability of the concept. The documented plan, however, should not be confining in its architectural requirements. It should give emphasis to the reasoning which produced the plan, rather than an exact description of its features.

Presentation can take any form that will serve to explain the plan and its rationale — sketches, narrative, photographs, plans, or models. The following contents, suggested for the presentation, indicate the extent and detail of the final plan study.

Objectives: Enumerate any aspects of the educational and social program which have a bearing on the environmental concept of the plan:
—desired integration among departments
—encouragement of social contact
—pursuit of individual study
—integration of commuters
—anticipated community participation
—special methods of study
—growth of community life

Site (regional and local): Describe the relation of the site to the region and locality, in terms of present and projected conditions. Information could cover:
—population
—type of industries
—availability of housing
—forms of transportation
—convenience of highway system
—land and water configurations
—architectural tradition
—distance from town

Site analysis: Give a general analysis of the characteristics of the site in terms of:
—open land
—streams
—existing planting
—existing buildings
—useable areas
—major slopes
—tree growth
—soil
—climatology

Decide the most advantageous use of the site for the various proposed functions.

Plan concept: Describe and illustrate the general plan concept in relation to the site and its features, including:
—the location of academic buildings, communal areas, outdoor recreation
—vehicular access and parking
—plans for expansion of the major elements
—outdoor teaching and research areas

Circulations: Vehicular
Describe the entrance and exit road system in relation to adjacent road pattern, anticipated traffic volume, and adjacent land uses.

Describe control and direction methods at access points. Illustrate internal road systems, showing location of:

Major approach roads ☐ entrances to campus ☐ distribution roads ☐ service drives ☐ restricted emergency-access drives ☐ parking and landings

Show growth pattern of roads to ultimate projection. Show service points, indicate functions and necessary visual control.

Consider the relation of road pattern to terrain and natural features; traffic volume, noise and speed; transportation from small to large scale; character of roads between highway and site; clarity of approach to arrival centre; separation between student, staff, and service entrances and routes.

Utilities: Convey the following information in addition to a description of the basic concept of the utilities plan:
—location and size of all main utilities entering and leaving the site, both existing and proposed
—source, location, and size of facilities for utilities within the site, existing and proposed, including:
heating ☐ electricity ☐ water lines ☐ sanitary sewer ☐ fire hydrants ☐ stream bed relocations ☐ special disposal systems
—methods and levels of distribution, horizontal and vertical, in relation to existing and proposed building structures
—methods of phased expansion of utilities to complement projected growth patterns. Indicate any maximum expansion potentials limits stated by any utility
—critical dates at which utilities must be made available to meet the schedule (include sources outside the site, as well as conversions and new plants within the campus)

Growth: Describe and illustrate:
—general system of growth for buildings and spaces
—expansion of each function
—enrolment figures for each phase of growth
—principles underlying the sequence and timing of growth
—cohesiveness at different phases of development
—provision for temporary accommodation in the initial growth stage
—control of disturbance caused by construction work during expansion, with respect to noise, dust, untidiness, access, and parking

Academic areas: Describe:
—the general policy guiding the disposition of major elements such as schools, departments, subject relationships, similar types of accommodation and the degrees of expansion required
—the system of linking elements such as streets, courts, classrooms, lecture theatres, communal facilities
—any major building system that is proposed for space construction: for example, modular building cells, demountable construction
—any system of academic grouping used: for example, proportion of classrooms to lecture theatres, laboratories to heavy workshops

Communal facilities: Describe:
—the major principles determining the disposition and type of communal facilities provided such as:
centralization/decentralization ☐ social focus ☐ intermix of disciplines ☐ intensive community use ☐ the character of activity areas ☐ accessibility to students, staff, local community
—the anticipated growth of communal areas and methods of physical provision such as:
decentralization of library facilities ☐ interchange of use areas ☐ allocation of specific or general building space
—any special policies or provisions influencing the location of individual communal elements including:
library ☐ administration ☐ auditoriums ☐ student centre group centres ☐ study carrels ☐ reading rooms ☐ meeting places ☐ dining places ☐ clubs ☐retail establishment

Athletics: Describe:
—general policy towards athletics as it affects the provision of facilities
—particular policies affecting facilities, such as programmed or unprogrammed participation; integration of men's and women's programs; degree of formal teaching or coaching and community use
—the type of facilities projected, such as
exercise rooms ☐ gymnasiums ☐ arena ☐ indoor courts ☐ outdoor courts ☐ track and field
—the accessibility of facilities, ranging from on-site exercise rooms to distant off-site community facilities
—the programed expansion of athletic facilities to serve increased student enrolment

Architectural Form: Describe and illustrate the general form and character desired for the total complex.

It will be necessary to consider some of the following items in detail, but any description should be a generalized guide, not a specific requirement.
—points of emphasis, an identity in the grouping
—relation of building heights to external spaces
—general architectural modeling of buildings
—approach to surface treatments, nature and character of furnishings of spaces: art, pools, fountains, etc.

—changing form and character as buildings are added
—any special integration features of buildings and terrain
—the influence of climate on architectural form

Spaces: Describe and illustrate where appropriate, the organizational structure of communal spaces throughout the campus.

Exterior spaces could include:
natural spaces ☐ outdoor athletic areas ☐ academic courts arrival court ☐ central core ☐ terraces ☐ intersections ☐ meeting places ☐ transition areas

Indoor spaces could include:
arrival space ☐ main hall ☐ pedestrian streets ☐ meeting places ☐ terraces ☐ intersections ☐ internal courts

Environs: Describe and illustrate, where possible, the desired visual relation of the site and buildings to its immediate environs.

Consider:
—the continuity of open spaces flowing from campus into surrounding lands
—the relation in scale, form, and materials to adjoining buildings
—the use of buffers to overcome disparity with adjacent land use
—the visual impression of the environs from within the campus
—the appearance of the campus viewed from the environs
—the progressive impression in travelling by vehicle or on foot, from the environs to the campus core
—the distinguishing features of the campus which give orientation and sense of direction from the approaches.

Landscape: Describe and illustrate, where appropriate, the overall effect to be achieved by the landscaping.

Policy guidance could be given for:
—location, type, and relative size of major landscaping materials
—desired relation to building elements to contrast or accentuate building forms
—desired relation of new work to existing landscape features
—functional use of landscape materials, such as windbreak, visual screen, sun screen, indication of direction, ground cover, or an enclosing element that prevents erosion
—decorative use of planting and its extent and location
—classification of landscape materials: upright, columnar, evergreen or deciduous
—phasing of landscape work in relation to the projected growth of campus
—grading plan showing new contours and spot elevations for major building and landscape elements

Cost Studies

The purpose of these final economic studies is to establish budgets and make recommendations on construction methods, bid timing, project sizes, and other facets that will assist in the future development of the college.

As costs have been rising steadily and may well continue, cost escalation factors should be taken into account in considering future levels of expenditure.

Costs should include all work that can reasonably be foreseen at this stage, but should exclude:
—acquisition of land
—unforeseen site conditions

Estimated costs should include, but differentiate between, items which may not be financed in whole or part from government sources. Other sources of financing may be required for such supplementary facilities as book stores and barber shops, and the external works related to these.

Costs should be based on areas of accommodation, rather than individual buildings, except where these are of a specialized nature. This will provide flexibility within the building phases.

Define the premiums, if any, that will have to be paid because of lack of skilled labour, lack of materials, special construction techniques, and simple factors. Evaluate the construction schedule in relation to other major construction proposed in the area.

Determine the probable rate of building. State how much building can be achieved per year in terms of expenditure. State the approximate dollar output per man/month and the average labor force that the rate would require. What percentage of the labor force in the area does this represent?

Make recommendations on special measures that can be taken to improve average productivity in problem areas. For example, in a continuous building program, the scheduling of the work may be so arranged as to provide a stable labor force with continuing employment. This would help recruiting and maintaining the labor force, resulting in higher productivity and improved workmanship. Industrialized building methods should also be assessed.

It is important, as in all costing phases in the development of the plan, that the basis of the costs and cost adjustment factors be recorded so that, when reviewing the plan, adjustments will match fluctuating building costs.

Operation Program

The purpose of this program is to convert the graphic plan into an operating plan, as a composite reference to facilitate the scheduling, budgeting, and overall coordination of development.

Charts or drawings presenting this information will be designed to accommodate a specific college program, but the following will indicate the type of information which may be included:

—start and finish dates for preparing temporary accommodation design work, tendering, alteration work, new construction

—site development:
grading ☐ roads ☐ planting ☐ major utility routing ☐
special features such as lakes or water towers

—land acquisition

—floor areas:
gross ☐ net ☐ units costs

—projected enrolment figures, budget estimates, phasing of development

A typical series of charts, shown on the following pages, indicates the necessity of constant review and revision of the operation figures.

The steps outlined in this booklet will result in a *Master Plan* to guide college development.

Conclusion

There will be many contributors and many activities to be scheduled and sources of information to be explored but, by proceeding in the suggested sequences and obtaining general and specific agreement at the end of each stage, progress can be rapid and orderly. Considerable advantage may be gained from the use of such scheduling techniques as the *Critical Path Method*, and projection techniques such as *Simulation Analysis*.

Following the *Master Plan*, the first phase of the building program will be determined and approved, then proceed, in a standard manner, through design and drawings, to construction. It is unlikely that the first building program, or subsequent phases, will match the projections exactly. The plan should, therefore, be assessed and adjusted as the college grows.

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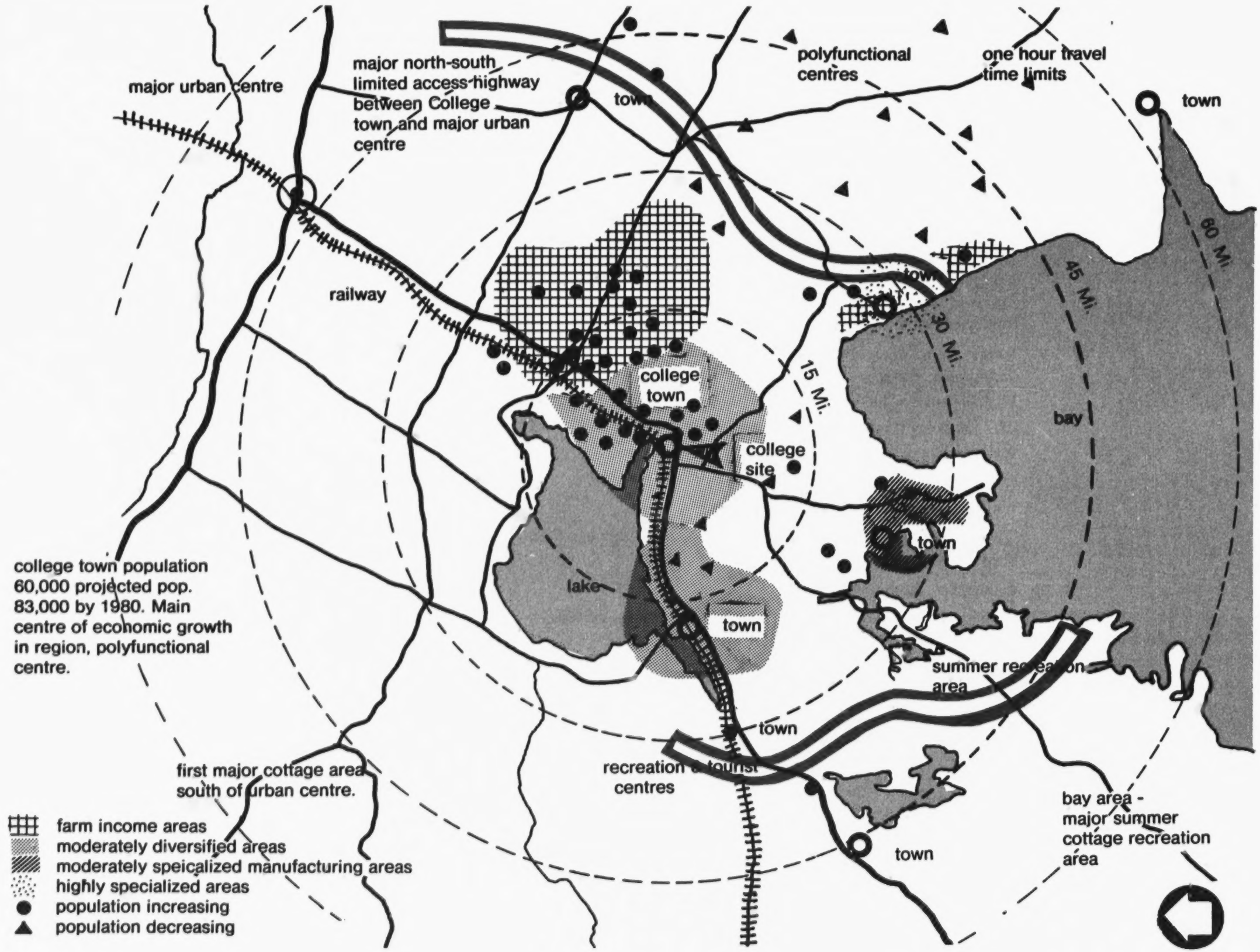
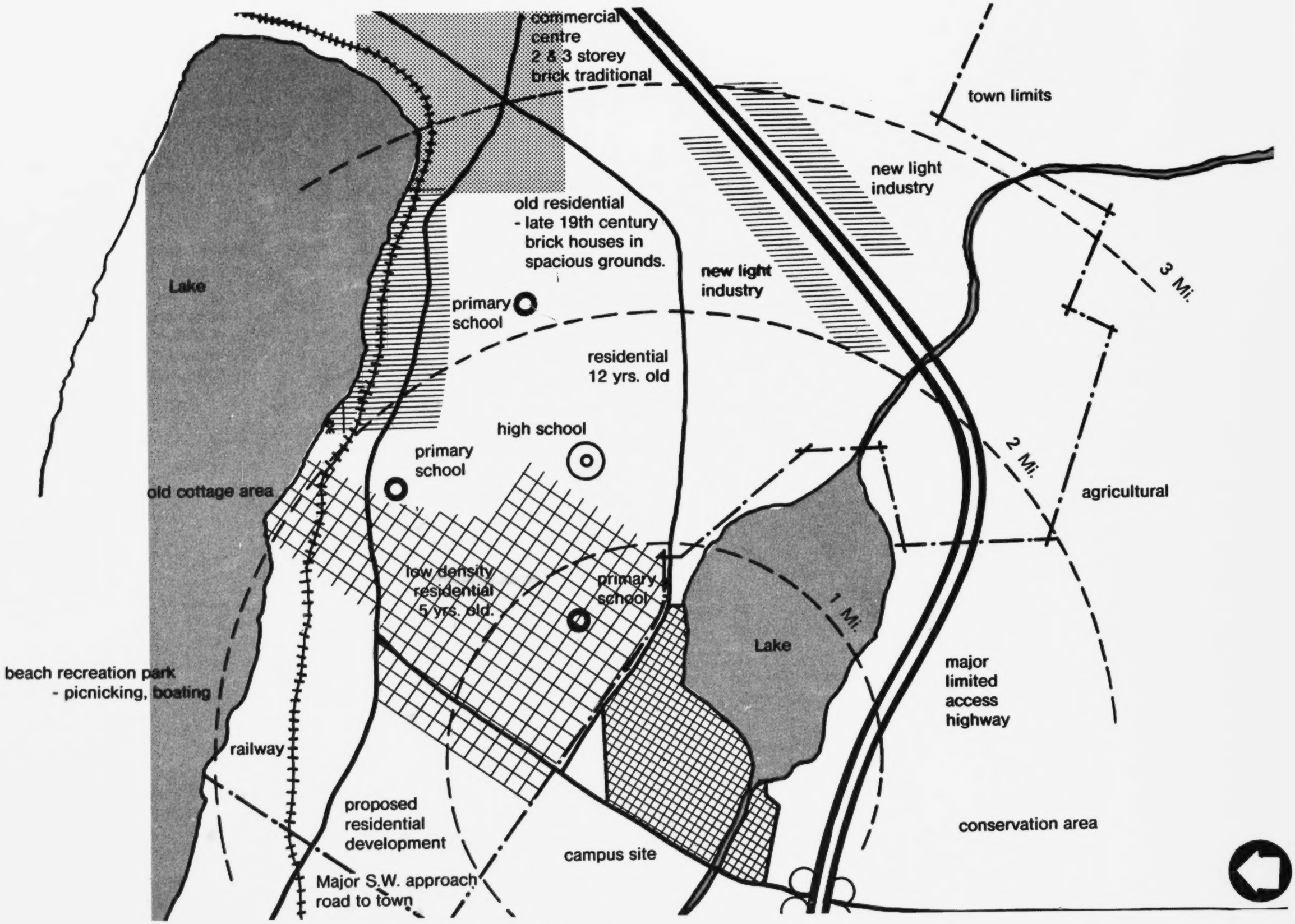
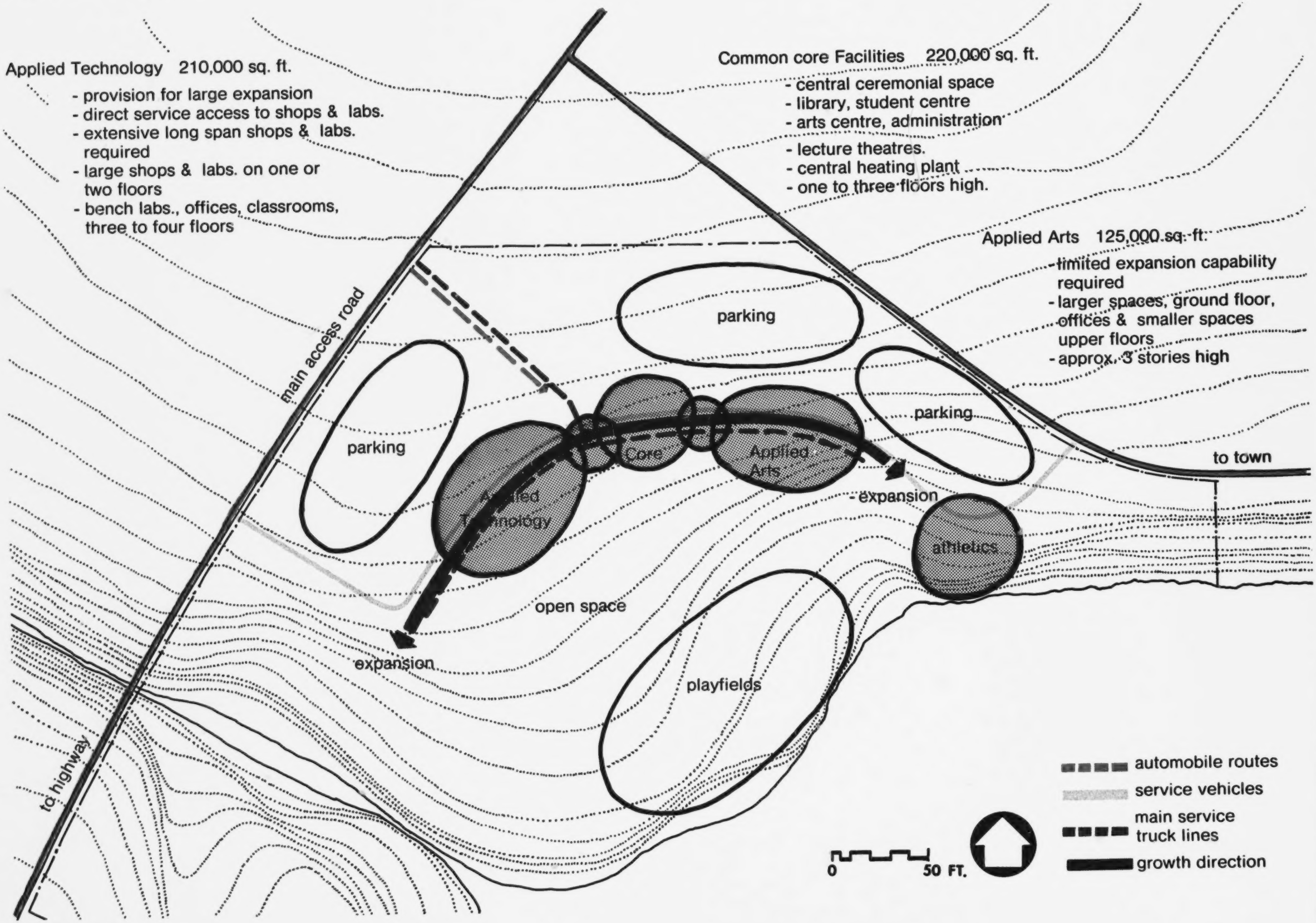
SITE: REGIONAL



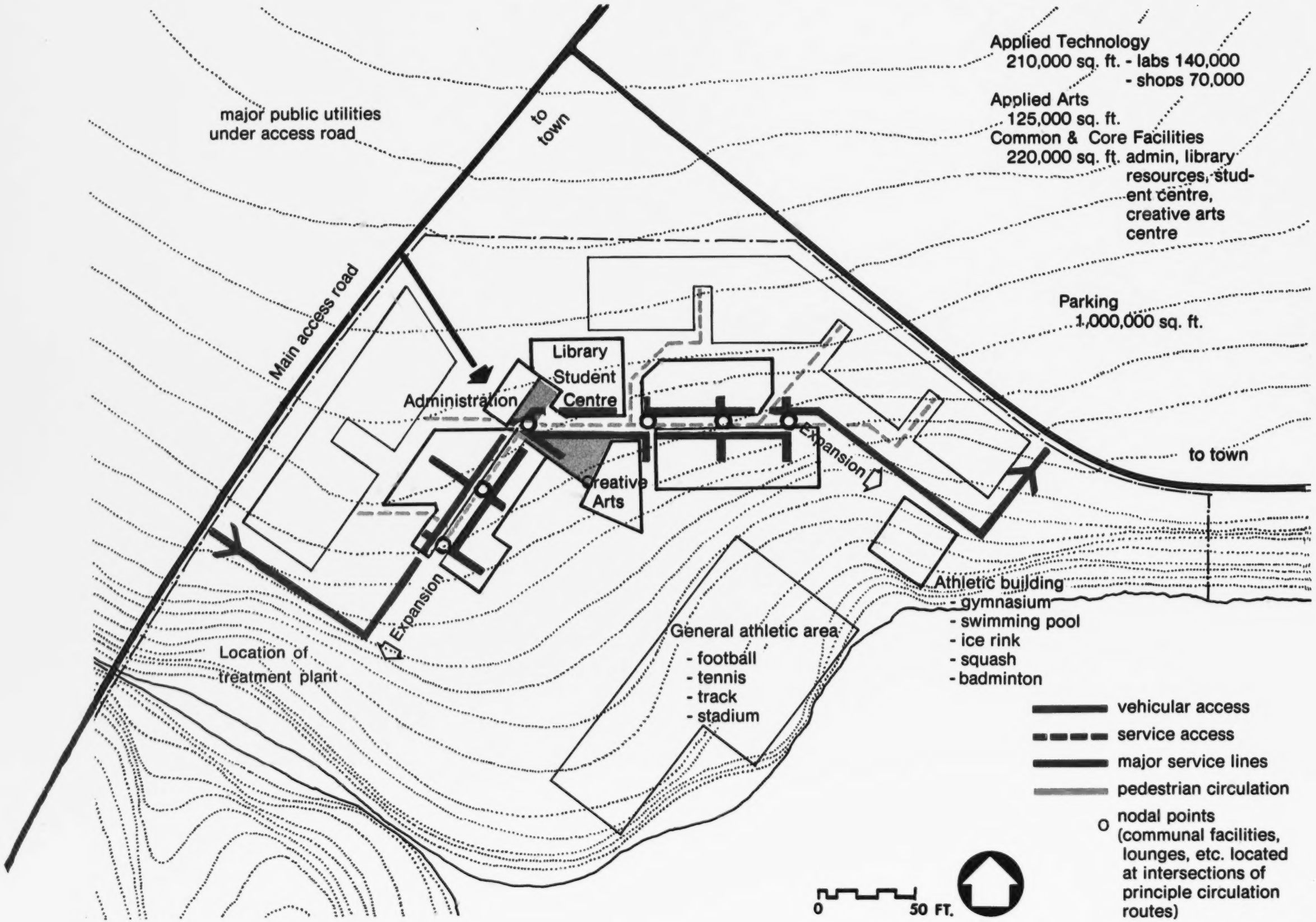
SITE: LOCAL


commercial centre 2 & 3 storey brick traditional
town limits
new light industry
old residential - late 19th century brick houses in spacious grounds.
Lake
primary school
new light industry
3 Mi.
residential 12 yrs. old
high school
primary school
2 Mi.
agricultural
old cottage area
low density residential 5 yrs. old.
primary school
1 Mi.
Lake
major limited access highway
beach recreation park - picnicking, boating
railway
proposed residential development
campus site
conservation area
Major S.W. approach road to town

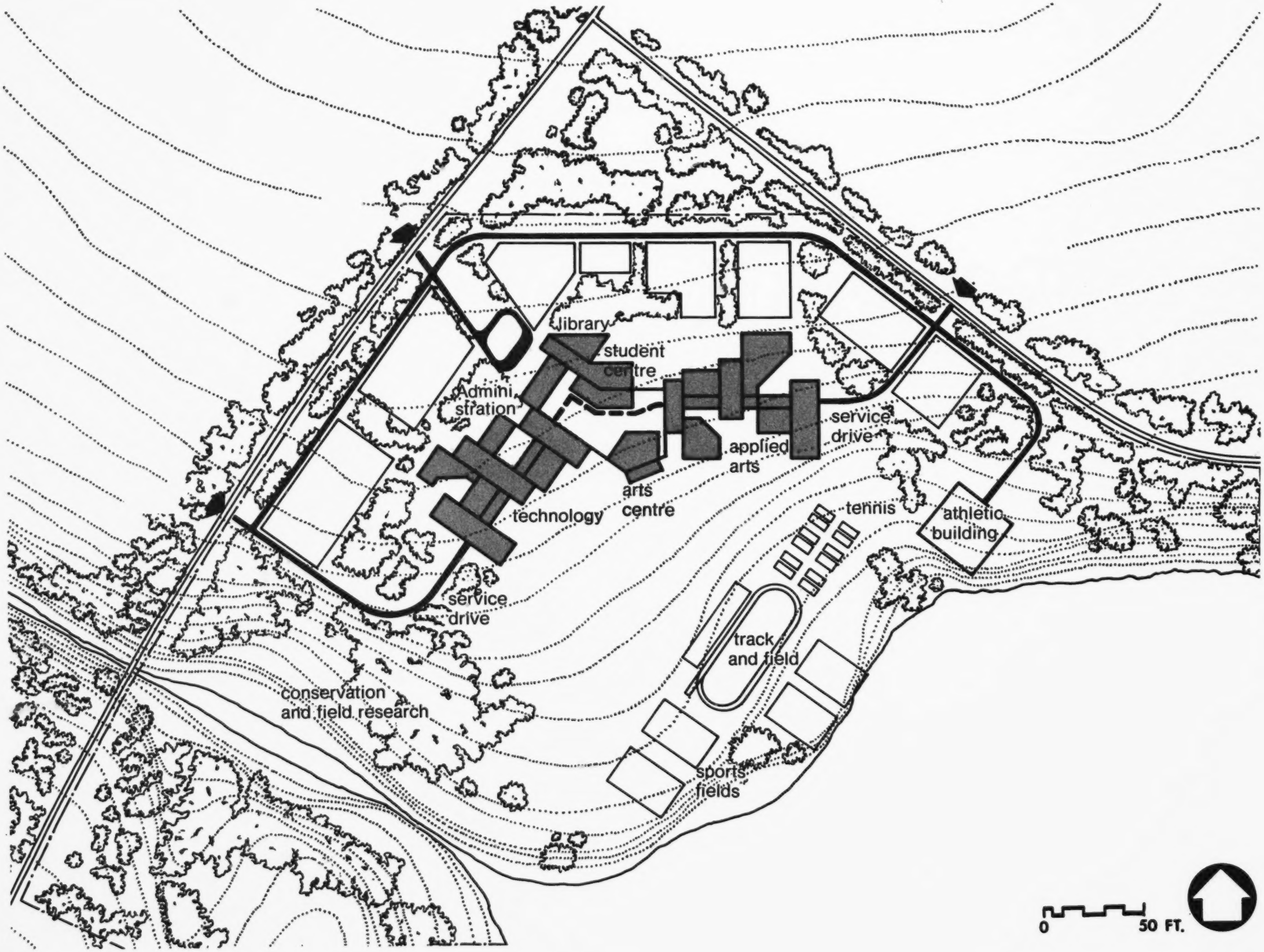
INITIAL CONCEPT



DEVELOPMENT OF CONCEPT



MASTER PLAN


library
student centre
Admini stration
service drive
applied arts
arts centre
technology
tennis
athletic building
service drive
track and field
conservation and field research
sports fields
0
50 FT.

SECTIONS

Bench labs. Shops. Labs.
Offices
Classrooms

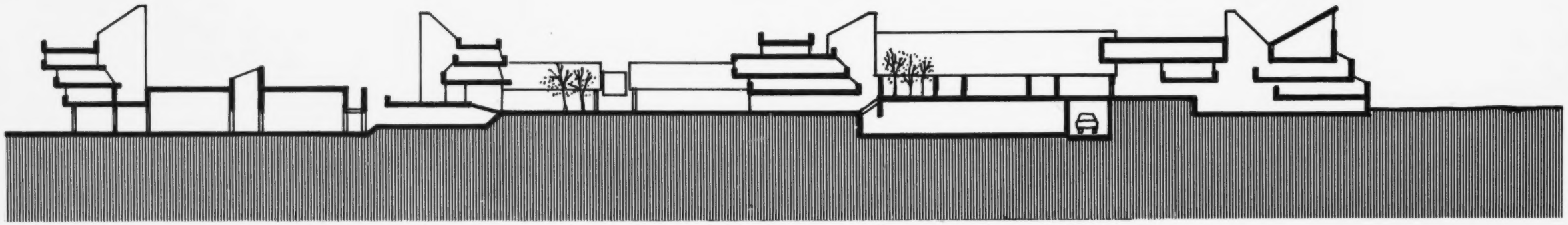
Bench Labs. Landscaped Court
Offices

offices
Classrooms
Bench Labs.

Central Core
Exterior Landscaped
Court

Administration
Library
Student Centres

parking



Applied Technology - South - west to North - east
Section

Road
&
Services

Service Core
under main plaza
Boilers, etc.

pedestrian
circulation

Services
(Mech'l)

Vehicular
service

Parking

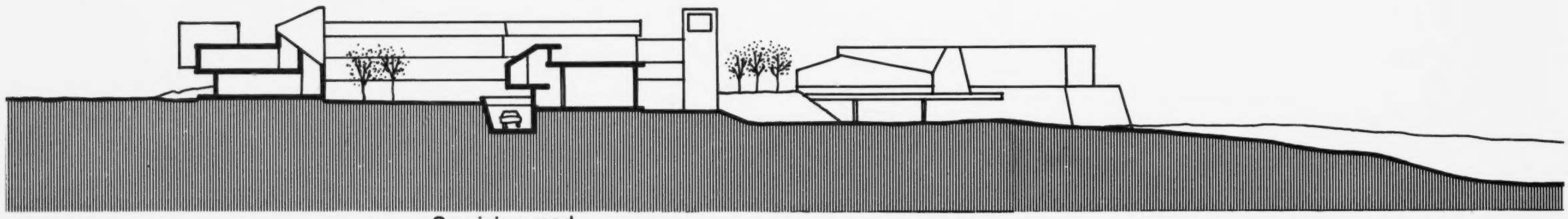
Shops
Labs

Court

Heavy
Shops
Labs.

Landscaped Open Space

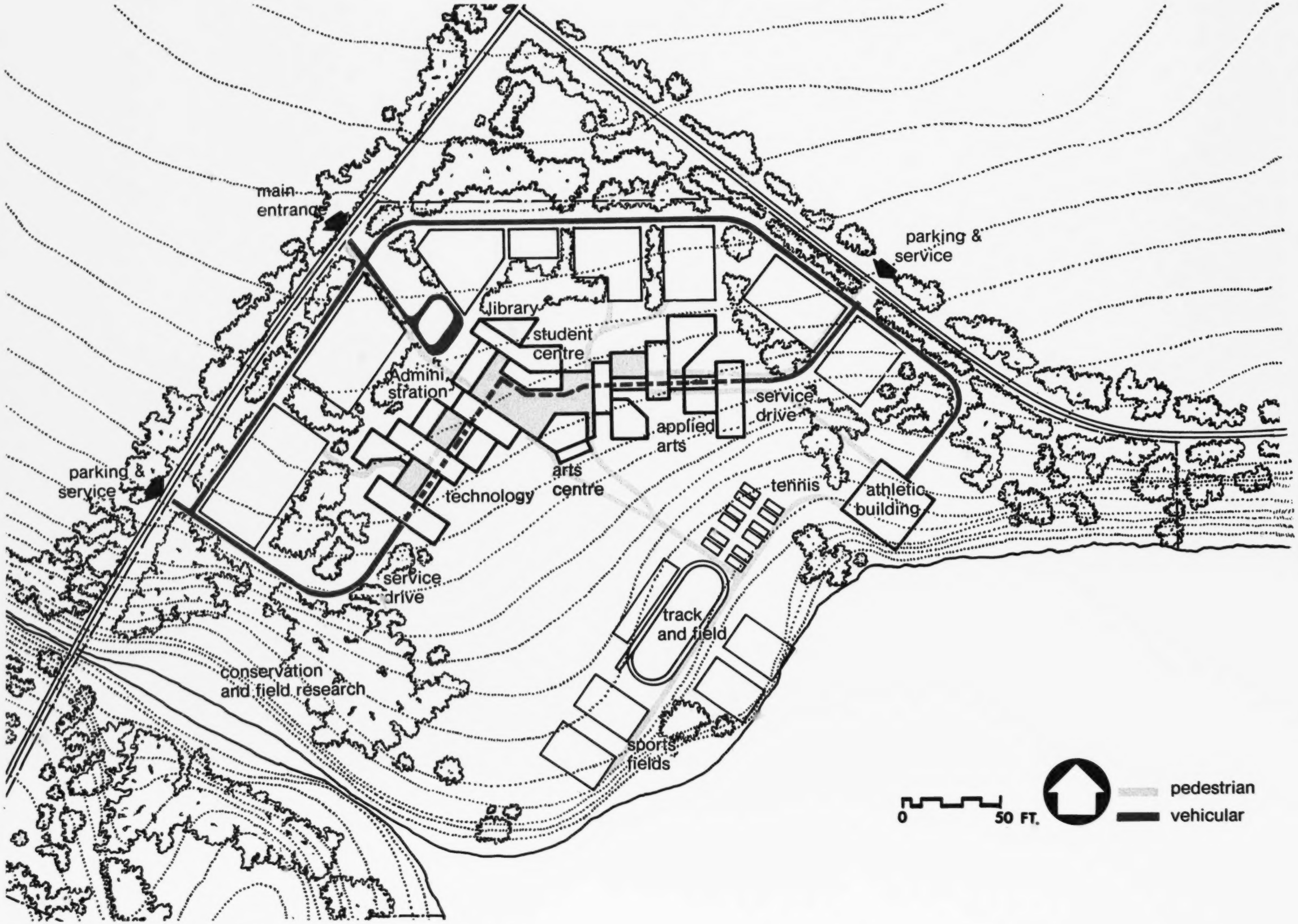
Sports field



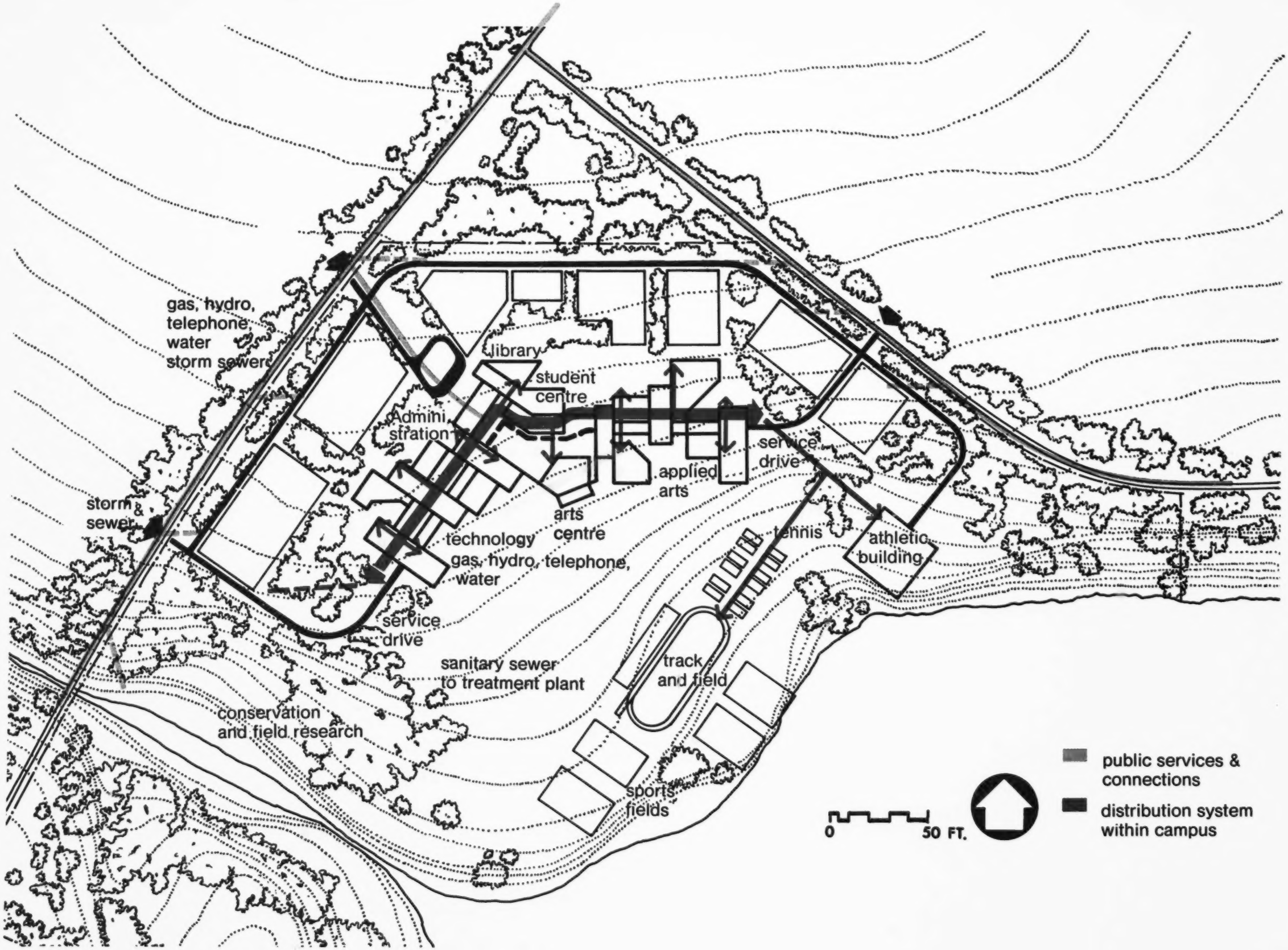
Servicing road
& Main Mechanical
Duct lines

APPLIED TECHNOLOGY - North - west to South - east
Section

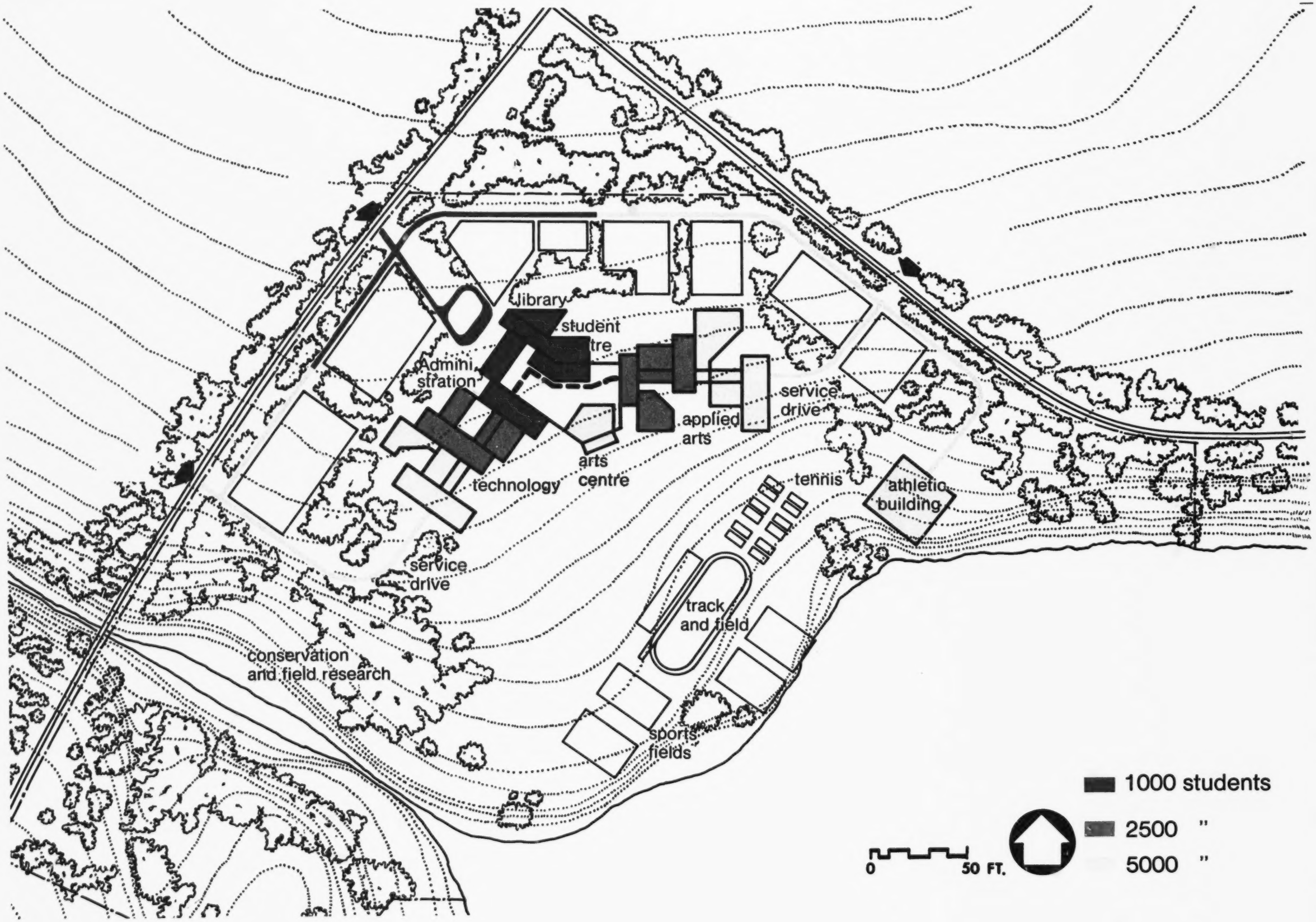
CIRCULATION



UTILITIES


gas, hydro,
telephone,
water
storm sewer
library
student
centre
Admini
stration
service
drive
applied
arts
arts
centre
storm &
sewer
technology
gas, hydro, telephone,
water
tennis
athletic
building
service
drive
sanitary sewer
to treatment plant
track
and field
conservation
and field research
sports
fields
0
50 FT.
public services &
connections
distribution system
within campus

GROWTH


library
student
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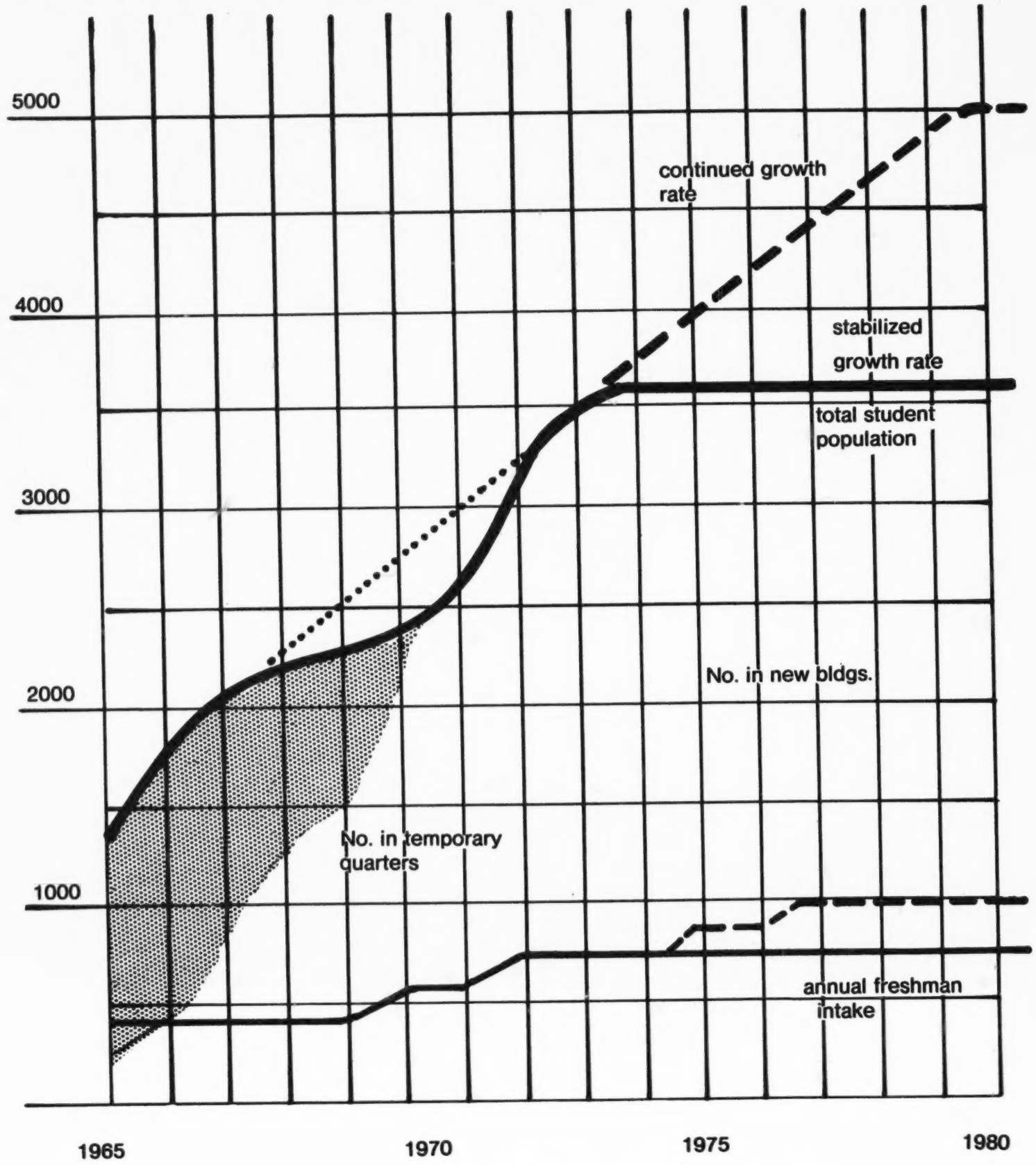
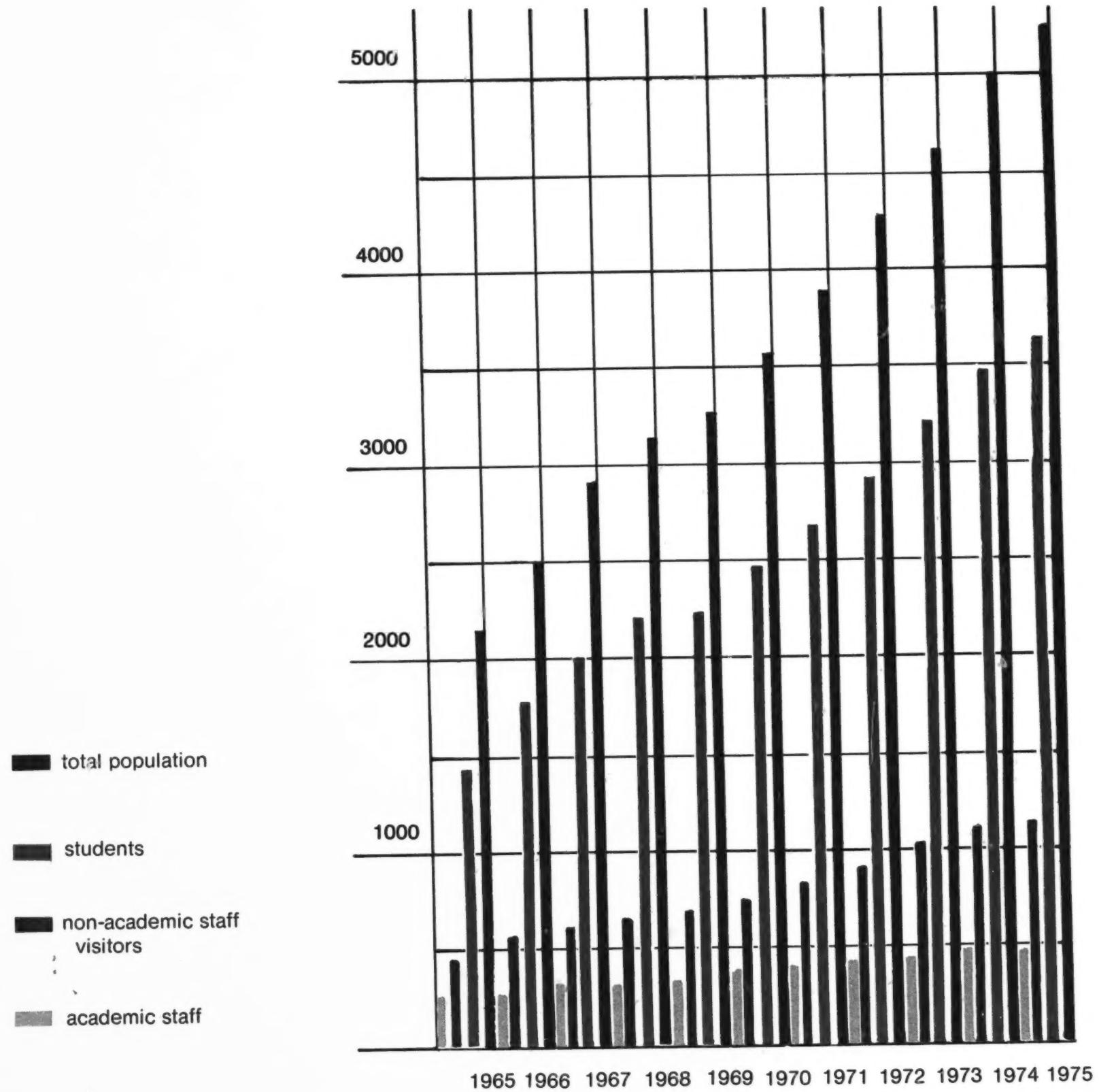
Admini
stration
service
drive
applied
arts
arts
centre
technology
tennis
athletic
building
service
drive
track
and field
conservation
and field research
sports
fields
1000 students
2500 "
5000 "
0
50 FT.

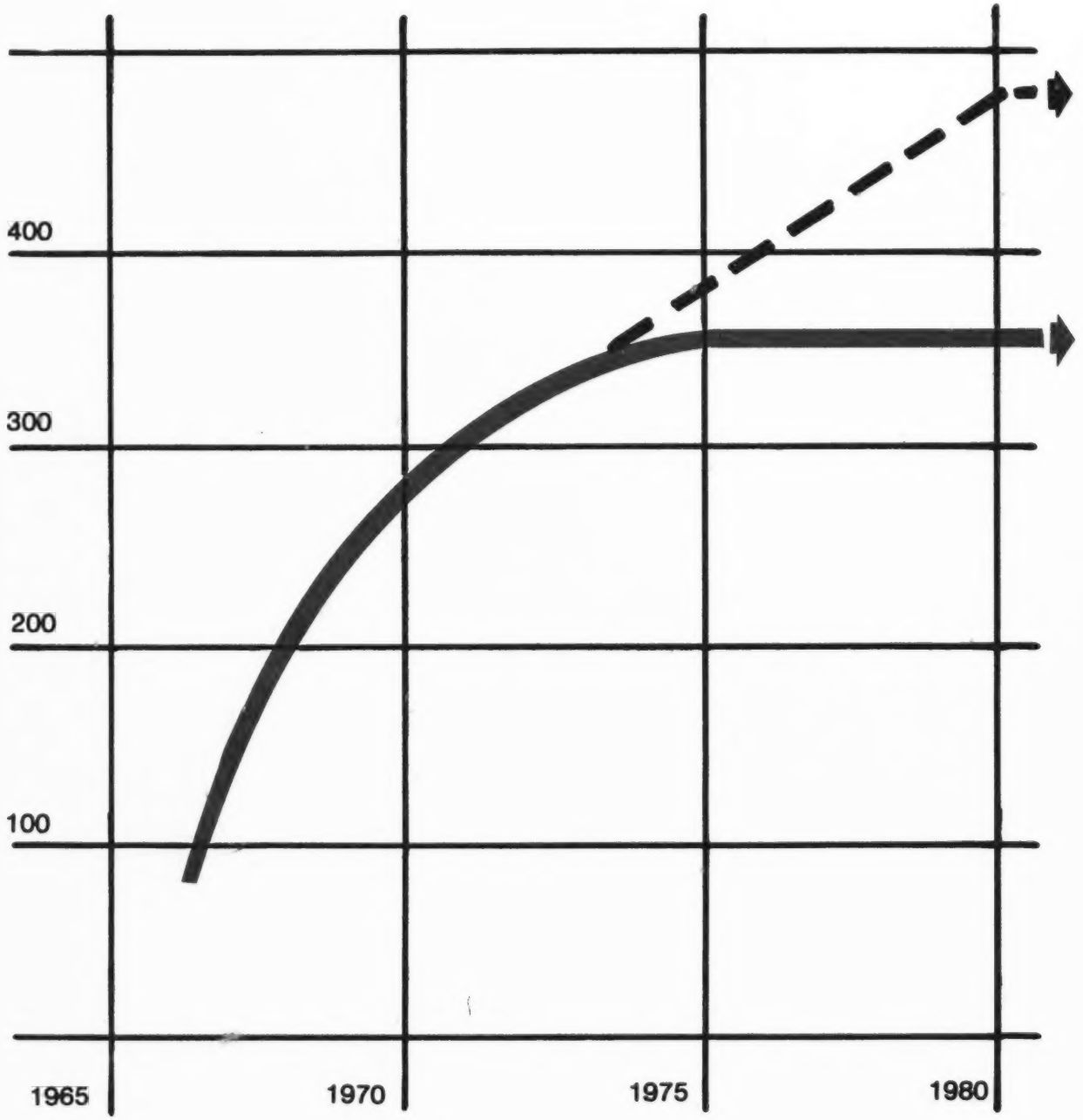
PROJECTED GROWTH OF STUDENT POPULATION



PROJECTED GROWTH OF COLLEGE POPULATION



CAR PARKING REQUIREMENTS 1965-1980



THE BUILDING PROGRAM:
PROJECTS AND ESTIMATED COSTS

Phase	Project	Approx. Net Floor Area sq. ft.	Approx. Gross Floor Area sq. ft.	Unit Cost sq. ft.	Budget in thousands	Constr'n Time	Start	Finish
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1.	Site development Stage 1.	-	-	-	150	6 mos.	Apr. 1968	Aug. 1968
	Central Library	44,000	55,000	36	200	7 mos.	July 1968	Nov. 1968
	Administration	24,000	27,500	25	70	5 mos.	Aug. 1968	Nov. 1968
	Student Centre							
	Applied Arts Accommodation							
	Applied Technology Accommodation							
	Total for Phase 1 (2+3+4+5+6+7)							
11	Site development Stage 2.							
	Theatre							
	Applied Arts							
	Applied Technology							
	Sports Centre							

THE DEVELOPMENT PROGRAM:
COMPLETION DATES & ACCOMMODATION PROVIDED

Phase	Description of Building & Brief Schedule of Accommodation	to be ready by
(a)	(b)	(c)
1 1968-71	Site Development Stage 1. Provision of main approach road & major utilities to first phase buildings. Site preparation for phase 1 buildings. General landscaping to phase 1, including parking & service roads, footpaths, playing fields and tree planting.	Aug. 1968
	Central Library - 50,000 volumes on open access shelves, reading space for 10% of student population 1968 to 1971 period.	Dec. 1968
	Temporary provisions for academic classrooms.	
	Administration - to serve immediate administrative and academic staff office needs up to 1974, at which time academic staff will have own premises.	Dec. 1968
	Student Centre	
	Applied Arts Accommodation	
	Applied Technology Accommodation	
11 1972-74	Site Development Stage 2.	
	Theatre	
	Applied Arts	
	Applied Technology	
	Sports Centre	

HE DEVELOPMENT PLAN PROGRAM